

PATENT APPLICATION

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

In re application of

Docket No: Q83621

Jean BEGUINOT

Appln. No.: 10/509,103

Group Art Unit: 1793

Confirmation No.: 9952

Examiner: JIE YANG

Filed: February 4, 2005

For: STEEL BLOCK FOR THE MANUFACTURE OF MOULDS FOR THE INJECTION
MOULDING OF PLASTICS MATERIAL OR FOR THE MANUFACTURE OF
METALWORKING PARTS

SUBMISSION OF APPEAL BRIEF

MAIL STOP APPEAL BRIEF - PATENTS

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Submitted herewith please find an Appeal Brief. The USPTO is directed and authorized to charge the statutory fee of \$540.00 and all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



Bruce E. Kramer
Registration No. 33,725

SUGHRUE MION, PLLC
Telephone: (202) 293-7060
Facsimile: (202) 293-7860

WASHINGTON OFFICE

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CUSTOMER NUMBER

Date: March 16, 2009

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For: STEEL BLOCK FOR THE MANUFACTURE OF MOULDS FOR THE INJECTION
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APPEAL BRIEF UNDER 37 C.F.R. § 41.37

MAIL STOP APPEAL BRIEF - PATENTS

Commissioner for Patents

P.O. Box 1450

Alexandria, VA 22313-1450

Sir:

In accordance with the provisions of 37 C.F.R. § 41.37, Appellant submits the following:

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I. REAL PARTY IN INTEREST

The real party interest is INDUSTRIAL FRANCE, by virtue of an assignment recorded by Assignment Branch of the U.S. Patent and Trademark Office on February 4, 2005, at Reel 016294, Frame 0821.

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II. RELATED APPEALS AND INTERFERENCES

To the knowledge and belief of Appellant, the Assignee, and the undersigned, there are not other appeals or interferences before the Board of Appeals and Interferences that will directly affect or be affected by the Board's decision in the instant Appeal.

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III. STATUS OF CLAIMS

Claims 1-15 are rejected and are being appealed.

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IV. STATUS OF AMENDMENTS

No amendment was filed subsequent to the final rejection of October 14, 2008.

V. SUMMARY OF THE CLAIMED SUBJECT MATTER

Independent claim 1 recites a steel block for the manufacture of moulds for the injection moulding of plastics material or the moulding of metals or for the manufacture of metal-working parts, having a thickness greater than 20 mm, of which the structure is completely martensitic or martensito-bainitic, of which the hardness at all points is between 430 HB and 530 HB and of which the chemical composition of the steel comprises, in % by weight:

$$0.180\% \leq C \leq 0.400\%$$

$$\text{Si} < 0.15\%$$

$$\text{Mn} \leq 2.5\%$$

$$\text{Ni} \leq 3\%$$

$$\text{Cr} \leq 3.5\%$$

$$\text{Mo} + \text{W}/2 \leq 2.8\%$$

$$\text{V} + \text{Nb}/2 + \text{Ta}/4 \leq 0.5\%$$

$$\text{Al} \leq 0.4\%$$

$$\text{Ti} + \text{Zr}/2 \leq 0.1\%$$

- boron in a content of between 0.0005% and 0.015%,
- optionally one or more elements from among sulphur, selenium and tellurium, the sum of contents of these elements being less than or equal to 0.2%,

– optionally one or more elements from among lead and bismuth, the sum of contents of these elements being less than or equal to 0.2%,

– optionally calcium in a content of less than or equal to 0.1%,

the remainder being iron and impurities resulting from production, the copper being an impurity, the chemical composition also satisfying the following equations:

$$3.2 \leq \text{Tr} \leq 9$$

$$85 \leq \text{Dr} \leq 95$$

$$\text{U/Dr} \leq 10.0$$

$$\text{Mo}^* + 3\text{xV}^* \geq 0.4\%$$

in which, for contents expressed in %:

$$\text{Tr} = 1.8\text{xC} + 1.1\text{xMn} + 0.7\text{xNi} + 0.6\text{xCr} + 1.6\text{xMo}^* + \text{K}$$

wherein $\text{K} = 0$ if the steel does not contain boron and $\text{K} = 0.5$ if the steel contains boron

$$\text{Dr} = 54\text{xC}^{0.25} + 24.5\text{x}(\text{Mo}^* + 3\text{xV}^*)^{0.30} + 1.58\text{xMn} + 0.74\text{xNi} + 1.8\text{xSi} + 12.5\text{x}(\text{Cr})^{0.20}$$

$$\text{U} = 1600\text{xC} + 100\text{x}(0.25\text{xCr} + \text{Mo}^* + 4.5\text{xV}^*)$$

$$\text{R} = 3.8\text{xC} + 10\text{xSi} + 3.3\text{xMn} + 2.4\text{xNi} + 1.4\text{x}(\text{Cr} + \text{Mo}^*)$$

$$\text{Mo}^* = \text{Mo} + \text{W}/2$$

$$\text{V}^* = \text{V} + \text{Nb}/2 + \text{Ta}/4$$

the contents of boron, aluminium, titanium, zirconium and nitrogen, expressed in thousandths of % by weight, being such that:

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$$B \geq \frac{1}{3} \times K1 + 0.5$$

wherein $K1 = \text{Min}(I^*; J^*)$

$$I = \text{Min}(N; N - 0.29(Ti + Zr/2 - 5))$$

$$I^* = \text{Max}(0; I) \text{ and } J^* = \text{Max}(0; J)$$

$$J = \text{Min} \left(N; 0.5 \left(N - 0.52 Al + \sqrt{(N - 0.52 Al)^2 + 283} \right) \right) \quad (\text{see, e.g., the disclosure at}$$

page 1, lines 1-8, page 3, line 5 to page 5, line 4, and page 8, lines 13-16 in the application as filed).

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VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The grounds of rejection to be reviewed on appeal are as follows:

(1) the rejection of claims 1-10 and 12-15 under 35 U.S.C 103(a) as being unpatentable over Ichikawa et al. (JP 8-165542), in view of Jean et al. (US 5,714,116) and Bobbert et al. (US 5,458,704), and

(2) the rejection of claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ichikawa et al. (JP 8-165542), in view of Jean et al. (US 5,714,116) and Bobbert et al. (US 5,458,704), and further in view of Lars-Ake et al (US 6,048,491).

VII. ARGUMENT

Obviousness Rejection of Claims 1-10 and 12-15

On page 2 of the final Office Action dated October 14, 2008, claims 1-10 and 12-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ichikawa et al (JP 8-165542) in view of Jean et al (US 5,714,116) and Bobbert et al (US 5,458,704).

Appellant respectfully submits that the present invention is not obvious over the cited art, and requests that the Board reverse this rejection in view of the following remarks.

Regarding the differences between the steel of the present invention and the steel which is described in JP 8-165542, Appellant submits that:

in the present invention, Si has to be less than 0.15%, in order to improve the thermal conductivity;

in JP 8-165542, the composition is adjusted in order to have Si content higher than 0.25%, and the lower limit is 0.2%;

in the present invention, boron is necessary;

in JP 8-165542 boron is considered as harmful;

in the present invention, hardness has to be between 430HB and 530HB, at all points;

in JP 8-165542, the hardness is less than 460HB by the side of the base material of a weld junction.

Regarding US 5,714,116, Appellant submits that this document describes an abrasion resistant steel, not a steel for moulds. Moreover, the chemical composition of the steel which is

described in this document has to be such that $\text{Si} + \text{Al} \geq 0.6\%$ and $\text{Al} \leq 0.2\%$. It results from these conditions that Si has to be greater than 0.4%. This is not compatible with the limit of 0.15% for Si according to the present invention.

Regarding US 5,454,704, Appellant submit that this document is related to a steel for armor, which is very different from a steel for moulds. In this document, there is no reason to limit the silicon content.

As there is a significant difference between the steel according the present invention and the steel described in JP 8-165542, and as the steels described in US 5,714,116 and US 5,454,704 are not steels for moulds and have significant differences with the steel of the present invention, Appellant submits that it is not possible to see how it could be obvious for those skilled in the art to combine the cited documents in order to obtain the steel according to the present invention.

Appellant considers that the reasoning of the Examiner is typically an ex post facto reasoning.

In particular, the Examiner recognizes that the present invention differs from each of the cited documents, and he takes some features of each document without other reason than to be able to combine it in order to obtain the present invention.

Appellant submits that there is no reason in the documents to make such combinations.

More specifically, in the cited documents, there is no information about the effect of silicon on thermal conductivity, nor on the necessity of increasing this property.

Moreover, Appellant submits that the combinations made by the Examiner are not only arbitrary but also contradictory, as can be seen from Appellant's previous arguments as summarized by the Examiner at page 3 of the last action.

For example, JP 8-165542 teaches away from the presently recited low silicon content in the disclosure at paragraph [0014] of JP 8-165542, US 5,714,116 teaches a different type of steel than JP 8-165542 (abrasion resistant steel vs. steel for moulds) and also teaches too high of a silicon content, and US 5,454,704 teaches a very different type of steel (steel for armor vs. steel for moulds), such that there is no reason why one skilled in the art would arrive at the silicon content of the present invention. Rather, the Examiner must rely on improper hindsight to selectively pick and choose disclosures from various references to support his position.

Thus, Appellant submits that the present invention is not obvious over JP 8-165542 in view of US 5,714,116 and US 5,454,704, and reversal of this rejection is respectfully requested.

Obviousness Rejection of Claim 11

On page 2 of the final Office Action dated October 14, 2008, claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP 8-165542 in view of US 5,714,116 and US 5,454,704, and further in view of Lars-Ake et al (US 6,048,491).

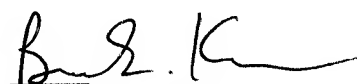
Appellant respectfully submits that it is submitted that US 6,048,491 does not make up for all the deficiencies of JP 8-165542, US 5,714,116 and US 5,454,704 as discussed above, so the

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present invention is not obvious JP 8-165542 in view of US 5,714,116 and US 5,454,704, and further in view of US 6,048,491. Accordingly, reversal of this rejection is respectfully requested.

The USPTO is directed and authorized to charge the statutory fee (37 C.F.R. §41.37(a) and 1.17(c)) and all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



Bruce E. Kramer
Registration No. 33,725

SUGHRUE MION, PLLC
Telephone: (202) 293-7060
Facsimile: (202) 293-7860

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CLAIMS APPENDIX

CLAIMS 1-15 ON APPEAL:

1. Steel block for the manufacture of moulds for the injection moulding of plastics material or the moulding of metals or for the manufacture of metal-working parts, having a thickness greater than 20 mm, of which the structure is completely martensitic or martensito-bainitic, of which the hardness at all points is between 430 HB and 530 HB and of which the chemical composition of the steel comprises, in % by weight:

$$0.180\% \leq C \leq 0.400\%$$

$$\text{Si} < 0.15\%$$

$$\text{Mn} \leq 2.5\%$$

$$\text{Ni} \leq 3\%$$

$$\text{Cr} \leq 3.5\%$$

$$\text{Mo} + \text{W}/2 \leq 2.8\%$$

$$\text{V} + \text{Nb}/2 + \text{Ta}/4 \leq 0.5\%$$

$$\text{Al} \leq 0.4\%$$

$$\text{Ti} + \text{Zr}/2 \leq 0.1\%$$

- boron in a content of between 0.0005% and 0.015%,
- optionally one or more elements from among sulphur, selenium and tellurium, the sum of contents of these elements being less than or equal to 0.2%,

- optionally one or more elements from among lead and bismuth, the sum of contents of these elements being less than or equal to 0.2%,
 - optionally calcium in a content of less than or equal to 0.1%,
- the remainder being iron and impurities resulting from production, the copper being an impurity, the chemical composition also satisfying the following equations:

$$3.2 \leq Tr \leq 9$$

$$85 \leq Dr \leq 95$$

$$U/Dr \leq 10.0$$

$$Mo^* + 3xV^* \geq 0.4\%$$

in which, for contents expressed in %:

$$Tr = 1.8xC + 1.1xMn + 0.7xNi + 0.6xCr + 1.6xMo^* + K$$

wherein $K = 0$ if the steel does not contain boron and $K = 0.5$ if the steel contains boron

$$Dr = 54xC^{0.25} + 24.5x(Mo^* + 3xV^*)^{0.30} + 1.58xMn + 0.74xNi + 1.8xSi + 12.5x(Cr)^{0.20}$$

$$U = 1600xC + 100x(0.25xCr + Mo^* + 4.5xV^*)$$

$$R = 3.8xC + 10xSi + 3.3xMn + 2.4xNi + 1.4x(Cr + Mo^*)$$

$$Mo^* = Mo + W/2$$

$$V^* = V + Nb/2 + Ta/4$$

the contents of boron, aluminium, titanium, zirconium and nitrogen, expressed in thousandths of % by weight, being such that:

$$B \geq \frac{1}{3} \times K1 + 0.5$$

wherein $K1 = \text{Min} (I^*; J^*)$

$$I = \text{Min}(N; N - 0.29(Ti + Zr/2 - 5))$$

$$I^* = \text{Max} (0; I) \text{ and } J^* = \text{Max} (0; J)$$

$$J = \text{Min} \left(N; 0.5 \left(N - 0.52 Al + \sqrt{(N - 0.52 Al)^2 + 283} \right) \right)$$

2. Steel block according to claim 1, of which the chemical composition is such that

$$R > 11$$

3. Steel block according to claim 1, characterised in that

$$R \leq 2.7 \times Tr$$

4. Steel block according to claim 1, characterised in that the carbon content is less than or equal to 0.35 % by weight.

5. Steel block according to claim 1, characterised in that $R/(2.7 \times Tr) \leq 0.90$.

6. Steel block according to claim 5, characterised in that $R/(2.7 \times Tr) \leq 0.80$.

7. Steel block according to claim 1, characterised in that $U/Dr < 9.0$.

8. Steel block according to claim 7, characterised in that the composition is such that:

$$0.230\% \leq C \leq 0.350\%$$

$$Si < 0.15\%$$

$$0.1\% \leq Mn \leq 1.8\%$$

$$Ni \leq 2\%$$

$$0.2\% \leq \text{Cr} \leq 3\%$$

$$\text{Mo} + \text{W}/2 \leq 2.5\%$$

$$\text{V} + \text{Nb}/2 + \text{Ta}/4 \leq 0.3\%$$

$$\text{Mo}^* + 3\text{xV}^* \geq 0.8\%.$$

9. Steel block according to claim 8, characterised in that its composition is such that:

$$0.240\% \leq \text{C} \leq 0.320\%$$

$$\text{Si} < 0.15\%$$

$$0.1\% \leq \text{Mn} \leq 1.6\%$$

$$\text{Ni} \leq 2\%$$

$$0.2\% \leq \text{Cr} \leq 2.5\%$$

$$0.3\% \leq \text{Mo} + \text{W}/2 \leq 2.5\%$$

$$\text{V} + \text{Nb}/2 + \text{Ta}/4 \leq 0.3\%$$

$$\text{Mo}^* + 3\text{xV}^* \geq 1.2\%.$$

10. Steel block according to claim 8, characterised in that $\text{Tr} > 4.5$.

11. Steel mould part machined in a block according to claim 1, of which at least a portion of the surface is hardened by nitriding and of which the hardness at all points is between 430 HB and 530 HB.

12. Steel block according to claim 1, wherein $\text{Si} \leq 0.13\%$.

13. Steel block according to claim 1, wherein $\text{Si} \leq 0.12\%$.

14. Steel block according to claim 1, wherein $\text{Si} \leq 0.1\%$.

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15. (new): Steel block according to claim 1, wherein $\text{Si} \leq 0.05\%$.

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EVIDENCE APPENDIX:

None.

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RELATED PROCEEDINGS APPENDIX

None.